consisted of a cannon-ball weighing about 5 lbs., suspended by a fine steel wire, which at its upper end passed through a hole drilled in an iron plug. The pendulum would continue to vibrate for sixteen or eighteen hours after being set in motion. After obtaining satisfactory results by using a ring of sand in the ordinary manner, a very stiff bristle was attached to the terminal spindle, and under it was placed a thin smoked-glass plate. The resistance was too great to allow the bristle to strike against the plate at each vibration of the pendulum, so that the device was adopted of fixing the plate upon a heavy brass disk capable of being raised or lowered by levelling-screws. This was placed under the pendulum before the latter was set in vibration, and then carefully raised until the bristle scratched its trace on the smoked-glass plate. After two or three oscillations of the pendulum the plate was lowered, great care of course being taken to avoid all possibility of rotation during this operation. At the expiration of fifteen, thirty, or sixty minutes it was again raised, and this process was repeated as often as desired. The inclination of the tracings was beautifully shown, and its amount agreed exceedingly well with that given by theory. With a heavier ball and longer wire even better results might have been obtained, but the motion of the pendulum used was but very slightly interfered with by the friction of the bristle. I should not omit to mention that the details of the experiment were carried out by Mr. F. W. Very, then a student at the institute. CHAS. R. CROSS

Boston, Mass., June 19

The Freshwater Medusa

IN NATURE, vol. xxii. p. 218, Prof. Allman by mistake attributes to me the conclusion that Limnocodium has no marginal canal, and that its radial canals are not pervious. A reference to NATURE, vol. xxii. p. 147, will show that in my first publication on the subject I gave as a character of the new genus Radiating canals 4, opening into the marginal canal. Marginal or ring canal voluminous." I made the same statement in my communication to the Royal Society on June 17, and have not since deviated from it. E. RAY LANKESTER

Artificial Diamonds

THE process of building up tubes, which Mr. Mallet has been so kind as to suggest to me through your valuable journal, has been tried, but was unsuccessful through the same defect as caused the failure of many of my other experiments, namely, leakage without bursting. Some of the tubes found empty would bear, when cold, a pressure of ten tons on the square inch without leaking, showing that the gases escaped through the porosity of the iron at a high temperature. Hydrogen and hydrocarbons seem to go through iron at a red-heat very easily, and the direction in which I am working is to obtain an impervious coating, or a method of "clogging" the iron, as seems to have sometimes taken place in the carbon experiments.

Experiments conducted since the reading of my paper have convinced me that the crystallisation of silica and alumina may yet be carried out with ease and certainty, and when I have rendered one of these processes a commercial success the experience gained in daily manufacturing operations will enable me to attack the carbon problem with much more certainty of obtaining definite results.

As I shall be writing an account of this work in the autumn I shall feel greatly indebted to any of your readers who, if they come across any not widely known experiments in this direction, will kindly communicate with me, so that I may have all the work done in this direction before me. Suggestions such as Mr. Mallet's are valuable to any worker, as the reactions of one brain must always be somewhat similar unless outside stimuli give new directions to its activity. I am always therefore thankful for either suggestion or corrections. J. B. HANNAY

Private Laboratory, Glasgow

Temperature of the Breath

THE average temperature of the interior of the human body, according to our best authorities, is 98°·6 F. What is the temperature of the breath? It might naturally be supposed that its temperature was the same as that of the interior of the body, or lower, if it is derived from the lungs, into which it is drawn from the cold outer air. But is this so?

The temperature of my body, as shown by the thermometer in the axilla and mouth, is normal, *i.e.*, about 98½°. On rising in the morning, before dressing or eating, I take the thermometer, wrap it up tightly in several folds of a silk handkerchief, and breathe upon it (expiring through the silk immediately over the bulb of the thermometer and inspiring by the nostrils). After five minutes of this operation I examine the thermometer, and find that it indicates a temperature of 106°·2. At 7 p.m., after brisk walking exercise, having eaten nothing since breakfast except a spoonful of boiled rice at 1 p.m., and having drunk nothing but half a tumbler of water and a mouthful of ginger-beer, I take the temperature of my breath in the manner described, for five minutes. I find the thermometer indicates 107°. Again, immediately after dinner, at which only water was drunk, the thermometer shows my breath to have a temperature of 108°. At other times the thermometer will not rise under apparently the same conditions higher than 102° to 105°. A temperature of 109° was observed by the correspondent of an American journal, but he does not mention under what circumstances this occurred.

How is this high temperature produced? It cannot, as a friend suggested to me, be caused by the condensation of the moisture in the breath by the silk handkerchief, for if the temperature of the breath as it issues from the lungs be the same as that of the lungs themselves, *i.e.*, not exceeding 99°, the silk, soon becoming much hotter, would rather tend to volatilise than to condense the moisture of the breath. Is it caused by the friction of the breath upon the fibres of the handkerchief? I know of no observations to show that a high temperature would be so caused. Is it the actual temperature of the breath as it issues from the lungs? If so, then it is by the breath that the system gets rid of its superfluous caloric. For this elevated temperature is not communicated to the blood oxygenated in the lungs; the blood in the left ventricle of the heart (which receives this oxygenated blood) being, according to some physiologists, lower in temperature than the blood in the right ventricle, which has not yet entered the lungs.

The few experiments I have made seem to show that the temperature obtained as above described is higher when the surrounding air is warm than when it is cold. This looks as if more caloric passed off by the breath when less can escape from the general surface of the body.

How these high temperatures are produced in the lungs, if they are developed there, is a mystery. Perhaps some of your readers may be able to explain.

53, Montagu Square, May 27 R. E. DUDGEON

Reversals by Memory

I SHOULD much like to know if it be a common thing for people to *reverse* the positions of objects in the memory. An artist, on returning from the National Gallery, painted the *Téméraire* from memory. Taking his picture to compare it with Turner's, he found to his surprise that he had reversed the positions of the ship, tug, sun, &c. His daughter tells me that if she wants to refer to a passage in a book she as often looks for it on a left-hand page, while it is on a right-hand page, or *vice versâ*. Another lady, on looking at a wood-engraving made from a sketch which she had seen some time previously, asked if the engraver had not reversed everything? These are the only cases known to me.

Is the following universally true?—

Let some one write with a blunt instrument the letter P on your forehead, or anywhere on the front half of the head from ear to ear, and the P must be written backwards for *you* to "see" it correctly. But if it be written anywhere at the back of the head, it must be written correctly both for you and the writer to read it. The change takes place abruptly in a line over each ear. GEORGE HENSLOW

Toughened Glass

THE night before last a lady of my family emptied a paper powder composed of 7½ grains of carbonate of potash and 7½ grains of carbonate of soda into a tumbler of what is called *toughened glass* less than half full of cold water. After stirring the mixture she drank the contents, leaving a silver tea-spoon in the tumbler, and then placed the empty tumbler on the table by her side within perhaps a foot of a burning duplex lamp. About five minutes afterwards a sharp explosion occurred, which startled

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all in the room. We found the tumbler shattered into fragments, the body of the glass ripped up, as it were, into several large, irregular-curved pieces, and the bottom of the tumbler broken into small pieces more resembling thick rough ice than anything else. Query: Was the explosion caused by the inherent properties of the toughened glass, or by the contact of potash, soda, the silver spoon, and proximity to a lamp, the heat from which was very slight, indeed scarcely perceptible to the hand at the spot where the tumbler stood?

The accident might have been very serious, for pieces of the glass flew to within a very few inches of the lady's face. A solution of the cause of the explosion is therefore of considerable importance to all who may have occasion to use vessels of this peculiar glass.

NOBLE TAYLOR

Sunninghill, July 7

Great Meteor

A METEOR of extraordinary brilliancy was seen on Friday, July 9, about 8·20 p.m.—almost in full daylight, the sun having only just set—by the Rev. Mr. Lloyd-Jones, who kindly took me to the place of observation and gave me the following particulars:—

The meteor was quite half as large as the full moon, of dazzling light-blue colour. It moved slowly in a path inclined about 10° to the horizon, from left to right, and emitted a train of ruddy sparks. Mr. Lloyd-Jones was looking in the opposite direction, and had time, after his attention was called to it by a friend, to turn round and see the last 10° of the path. The total duration may have been ten seconds, and could not have been less than five, the meteor dying out slowly. The point of disappearance was carefully noted and referred to some trees about 200 yards distant. I afterwards found it to be in true azimuth N. 69½° E., altitude 9°. No detonation was heard. The place of observation was about two-thirds of a mile east of the Royal Observatory, Greenwich.

G. L. TUPMAN

Iron and Hydrogen

MAY I be allowed to point out that the question of the occlusion of hydrogen in steel, and its influence in hardening, has been discussed by Mr. Wm. Anderson in his report to the Committee of this Institution on the Hardening, &c., of steel.

At the last meeting of this Institution Prof. Hughes stated that his experiments did not support the hydrogen theory, but rather the view that hardened steel was an actual alloy of carbon and iron, unhardened steel a mixture only. I may add that experiments are now in progress, designed to test the truth of this latter view.

WALTER R. BROWNE
Secretary

Institution of Mechanical Engineers, July 12

The Stone in the Nest of the Swallow

THE swallow stone is the agate pebble, called in French *chélédoine*—the name given to the chalcedony (NATURE, vol. xxi. p. 494), but the same virtue is attributed to the swallow herb. This is the *Chelidonium majus*, about which Britten and Holland, in their "English Plant Names," give the following quotation from Lyte:—"Chelidonium, that is to say, swallow-herbe, bycause (as Plinie writeth) it was first found out by swallowes and hath healed the eyes and restored sight to their young ones that had harme in their eyes or have bene blinde."

Littré, in his great *Dictionnaire*, gives two quotations, in which *Chélédoine* is used in a botanical sense:—

> "Se vus avez as oils manjue
> Dunc prenez celedoine et rue."
> *MS. St. Jean, 13th century.*

> "Aussi les guerit le jus de cheledoine, le lait de tithymal."—
> *Pare, v. 21, 16th century.*

He also gives its meaning as the name of a precious stone, and adds: "Petits cailloux appartenant aux agates, on dit aussi pierres d'hirondelle." With respect to its etymology he says he derives it from "*χελιδόνιον*, de *χελιδών*, hirondelle, à cause qu'on disait que l'hirondelle se servait de cette plante pour rendre la vue à ses petits."

WILLIAM E. A. AXON

Fern Bank, Higher Broughton, Manchester

THE CARIBBEAN SEA

THE Coast Survey steamer *Blake*, Commander J. R. Bartlett, U.S.N., Assistant Coast Survey, recently returned from a cruise taking soundings, serial temperatures, &c., in the course of the Gulf Stream, under instructions from C. P. Patterson, Superintendent Coast and Geodetic Survey, has brought very interesting data in regard to the depths of the western portion of the Caribbean Sea.

The depths and temperatures obtained last year in the "Windward Passage" between Cuba and San Domingo were verified, and a few hauls of the dredge taken directly on the ridge in this passage. The data obtained render it very probable that a large portion of the supply for the Gulf Stream passes through this passage, and that the current extends in it to the depth of 800 fathoms. A few lines of soundings with serial temperatures were run from Jamaica to Honduras Bank, *viâ* Pedro and Rosalind Banks, and it was found that the temperature of 39½°, obtained at all depths below 700 fathoms in the Gulf of Mexico and the Western Caribbean, could not enter through this portion of the sea. But the temperature at the depth of 800 fathoms on the ridge in the "Windward Passage" between Cuba and Hayti was found to agree with the normal temperature of the Caribbean and Gulf of Mexico, viz., 39½°. Soundings were taken between Hayti and Jamaica, developing a general depth between these islands not exceeding 800 fathoms, except where broken by a remarkably deep channel connecting the waters of the main Caribbean south of San Domingo with those north of Jamaica. This channel runs close to Hayti with a greatest depth of 1,200 fathoms, and a general depth of 1,000 fathoms. Its course is northerly along the western end of Hayti, where it does not exceed a width of 5 or 6 miles; thence westerly, south of Navassa Island, with a tongue to the northward between Navassa and Foxmigas Bank, and another to the westward between Foxmigas Bank and Jamaica.

A line of soundings was run from San Iago de Cuba to the east end of Jamaica, where a depth of 3,000 fathoms was found 25 miles south of Cuba. This deep place was found by subsequent soundings to be the eastern end of an immense deep valley extending from between Cuba and Jamaica, to the westward, south of the Cayman Islands, well up into the Bay of Honduras. The Cayman and the Misteriosa Bank were found to be summits of mountains belonging to a submarine extension (exceedingly steep on its southern slope) of the range running along the south-eastern side of Cuba. This deep valley is quite narrow at its eastern end, but widens between the western end of Jamaica and Cape Cruz, where the soundings were 3,000 fathoms within 15 miles of Cuba, and 2,800 fathoms within 25 miles of Jamaica. Near Grand Cayman the valley narrows again, but within 20 miles of this island a depth was found of 3,428 fathoms. The deep water was carried as far as a line between Misteriosa Bank and Swan Islands, with 3,010 fathoms within 15 miles of the latter. On a line between Misteriosa Bank and Bonacca Island there was a general depth of 2,700 fathoms, and a depth of over 2,000 fathoms extended well into the Gulf of Honduras. Between Misteriosa Bank and Chinchorro Bank the soundings were regular at 2,500 fathoms. North of Misteriosa and Grand Cayman, to the Isle of Pines and Cape San Antonio, the soundings were generally 2,500 fathoms. The serial temperatures agree, in relation to depth, with those obtained in the Gulf of Mexico, by Lieut. Commander Sigsbee, and in the Eastern Caribbean by Commander Bartlett; decreasing from the surface to 39½° at 700 fathoms, or less, and constant at that temperature for all depths below 700 fathoms. At greater depths than 600 or 700 fathoms the bottom was always found to be calcareous ooze composed of Pteropod shells with small

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